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Debt and Economic Activity in the United States

There are still some mysteries left in the U.S. economy. One of them, notes NBER Research Associate **Benjamin M. Friedman** in *Working Paper No. 704, Debt and Economic Activity in the United States*, is the remarkably steady relationship between outstanding debt and economic activity. That relationship is indeed just as steady as the more recognized and better understood relationship between economic activity and money.

The aggregate outstanding indebtedness of all non-financial borrowers in the United States has been approximately \$1.40 for each \$1.00 of the economy's gross national product—that is, the nation's total output of goods and services—ever since World War II. That debt-to-income ratio has displayed neither trend nor cyclical variation in the postwar period.

This is remarkable considering the rich variety of ways that U.S. businesses and individuals can finance their activities. "Businesses investing in new plant and equipment can rely on internally generated funds, or they can raise external funds from the financial markets," writes Friedman. When they do turn to external sources of funds, they can issue either debt obligations or new equity shares in the enterprise. Individuals can likewise use their own or borrowed funds to make major purchases such as automobiles, and many individuals can also borrow to finance ordinary consumer spending apart from major hard goods. Even in arranging home purchases, transactions that are almost always partly debt financed, individuals usually can choose what fraction of the purchase price initially represents their own equity.

Concludes Friedman: "In principle, businesses and individuals are continually making these and other financing choices on the basis of yield comparisons, credit availability, and other considerations, so that the total amount of debt financing does not necessarily have to bear any close relationship to the underlying economic activity."

Yet it does. Moreover, he adds, the stability of that relationship does not merely represent the stability of

a sum of stable parts, as is apparently the case (apart from trend) among the familiar monetary aggregates that are often in the news. Neither private-sector debt nor government debt has borne a stable relationship to economic activity, but their total has. In particular, the long-term rise and procyclical fluctuation in the private sector's debt have approximately offset the corresponding secular decline (relative to income) and countercyclical fluctuation in the federal government's debt. It has been, in other words, a seesaw relationship—one side going up when the other goes down.

Friedman sees some important implications for the economy as a result of this relationship: it touches on the choice of an appropriate monetary policy target and is potentially relevant for fiscal policy, considering the popular thesis that debt-financed government spending crowds out private investment. Moreover, Friedman points out, it is important in relation to the current widespread concern over inadequate capital formation in the United States.

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A first section of the paper examines the statistics of this stable relationship between the economy's outstanding debt and its income. There was a shift associated with the fall of prices after World War I. Also, debt repayment could not keep up with the plunge of output in the Great Depression (1930-33). Basically, however, that debt-income ratio has remained virtually unchanged since 1921.

In a second section, Friedman makes comparisons of other financial liability aggregates (such as nonfederal debt, private nonfinancial debt, and bank credit) and of asset aggregates (such as the monetary base and various money measures) as to the stability of

their relationship to national income. Some of his tests suggest that the debt-to-income relationship may be more stable than any of the various money-to-income relationships; others indicate that debt-to-income is a little less stable.

Attempting to answer this "major research challenge," Friedman discusses three hypotheses. One possible explanation is the "ultrarationality" hypothesis that individuals "see through the shell" of government and corporations. Should the government's debts in relationship to total economic activity decrease, the private sector (households and the corporations owned by households) will simply adjust by issuing enough debt to offset the government's action. Or possibly, as corporations change their debt position for various reasons, such as tax law changes, individual households adjust their debt positions to offset the actions of both government and corporations.

One implication of this hypothesis is that deficit policy can have no effect on the economy either in the short or long run. For instance, if the government raises spending, financing it with debt, the private sector will be "crowded out." So overall national spending will remain unchanged and the economy will not get a boost.

A second potential explanation is a "capital leveraging" hypothesis. It maintains that people have not only a stable target for net wealth. They also have a stable subtarget for total assets in relation to income. They will vary their holdings of tangible assets so as to offset variations in the government's outstanding indebtedness. That's because there are collateral restraints on borrowing. For example, households borrow against such tangible assets as houses or refrigerators. Such debts amounted to 89 percent of the household sector's credit market indebtedness at the end of 1980. Similarly, corporations issue "first mortgage" bonds in the long-term debt market, or secure short-term bank debt by inventory holdings. As the private sector holds relatively less government debt, it can hold more tangible assets that can back more private-sector debt.

This hypothesis implies that the government's deficit is a major determinant of the private sector's investment in plant and equipment, homes, and other physical investments. But it does not rule out the possibility that fiscal policy can either boost or restrain the economy.

A third hypothesis, the "asset demand" hypothesis, maintains that if the separate streams of services provided by tangible assets and financial assets are imperfect substitutes, then people will have stable subtargets in relation to income for the two asset classes separately. In other words, the demand for financial assets, given income, will be relatively inelastic. Since total financial assets held must equal total financial assets issued, the combination of inelastic demand and a supply that is at least partly elastic will also result in a stable relationship between income and total financial assets issued.

But the relationship discussed is between debt—not total assets, which could include stock—and in-

come. So Friedman finds this hypothesis an insufficient explanation. However, he does find some positive evidence consistent with this hypothesis and with each of the other two hypotheses. The evidence, though, is insufficient to choose among them.

Friedman concludes: "The debt-to-income phenomenon remains for the present a major puzzle."

Nonetheless, in a concluding section, Friedman analyzes the problem of capital formation in the United States and concludes that the corporate sector will be able to undertake more investment in plant and equipment only if the government's relative indebtedness falls, or if corporations turn increasingly to equity finance through retention of internally generated funds or issues of new shares.

If government debt does decrease relative to income, enabling the corporate sector to finance sharply increased capital outlays, there may be a problem of higher financial risk for corporations, but this risk could be reduced by greater reliance on equity finance.

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Raw Materials, Profits and the Productivity Slowdown

It is widely accepted that the explosion of oil prices in the early 1970s contributed to accelerated inflation and unemployment in the United States after 1973. But were oil prices also the key to the post-1973 slowdown in the growth of labor productivity both here and abroad? In *NBER Working Paper No. 660R*, **Raw Materials, Profits, and the Productivity Slowdown**, Research Associate **Michael Bruno** finds that the slowdown in manufacturing productivity is largely due to the relative increase in raw materials prices—including oil, but not primarily oil, nor even energy.

Moreover, Bruno's analysis shows that the higher raw materials prices reduce productivity directly (by reducing the amount of raw materials per unit of labor, which in turn reduces the productivity of labor). There is a separate effect through reduced profits, and therefore capital formation, but the basic effect of the increased raw materials prices is quite apart from that.

Bruno discovers first that, "the direct energy input is simply too small, percentagewise, to explain the sizable changes that have taken place in productivity. The size of the direct energy share in total manufacturing output is of the order of 2 to 3 percent, compared to an order of magnitude of 30 to 65 percent of all other material inputs."

Using an analysis that relates productivity and profits to the inputs of labor, capital, and raw materials, Bruno's study examines the manufacturing sectors of four major industrial countries: the United States, United Kingdom, Germany, and Japan. In the early 1970s, all four manufacturing sectors experienced a sustained and unambiguous rise in the cost of raw materials relative to the price of their own products.

The relative price of raw materials rose roughly 40 percent in the United Kingdom and Japan, 30 percent in the United States, and 10 percent in Germany where the appreciation of the mark lowered the real cost of imported raw materials. These raw materials prices remained high, with some fluctuations, throughout the decade of the 1970s. As a consequence, the ranking of the slowdowns in productivity in the four countries corresponds exactly to the increases in the raw materials prices: Japan (which adjusted well), the United States, United Kingdom, and Germany.

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For all countries except Japan, the 1970s increases in raw materials prices were preceded by 15 years of steady decline (at about 1 percent per year) in the relative cost of materials inputs. During that 15-year period, the prices of both raw materials and oil were falling in the world market, and this contributed to rising labor productivity.

Bruno also shows that the effect of the rising prices of manufacturing inputs on profitability depends in part on what happens to real wages (that is, returns to labor). In the United States, for example, the rise in raw materials prices with no change in the real wage would have caused profitability to decline by about one-fourth in the 1970s. In fact, real wages dipped about 10 percent (relative to their previous trend), moderating the decline in the U.S. profitability to about one-eighth of its previous value. In Japan, real wages dropped sharply from 1972-78, and profitability declined only about half as much as it would have otherwise with the raw materials price increases.

In summary, the production model that Bruno uses attributes nearly all of the slowdown in total productivity in the four countries to rising prices of raw materials.

Tax Reform and Corporate Investment

A new study by **Michael A. Salinger** and **Lawrence H. Summers** of MIT and NBER, **Tax Reform and Corporate Investment: A Microeconomic Simulation Study**, *NBER Working Paper No. 757*, indicates that corporate tax reforms could have substantially larger effects on companies' stock market values than on their incentives to invest in new plant and equipment. The study also suggests that the impact on both market value and investment incentives would vary dramatically among companies.

Salinger and Summers simulate the effects of several changes in the corporate tax code on the 30 Dow

industrial companies using an extended version of Tobin's q theory of investment. In addition to providing estimates of tax-policy effects, their study gives strong microeconomic support for the q theory itself.

The essential insight underlying Tobin's q theory is that a company will purchase capital assets only so long as each dollar spent raises the value of the firm by more than a dollar. Tobin assumes that a good estimate of the marginal value of capital equipment is the average value of existing equipment. Thus, companies will continue to invest so long as q —the ratio of their market value to the replacement value of their assets—is greater than 1.

Assessing tax changes in terms of their effect on q has several advantages. First, it is “supply” oriented, in the sense that it assumes companies make output and investment decisions simultaneously. Standard econometric approaches to investment decisions assume that output is predetermined. Second, q theory takes account of taxes at the shareholder level because they are factored into market values; most of the literature on tax policy and investment ignores shareholder taxes. On the other hand, the q theory is handicapped by two simplifying assumptions—that all capital is malleable and homogeneous, and that companies face constant returns to scale and earn no economic rents.

Salinger and Summers believe their approach also addresses several critical concerns in tax-policy analysis. One is the avoidance of large windfall gains and losses. That concern is closely related to the goal of providing incentives only at the margin. Another important consideration is vertical equity—the distribution of the tax burden across the wealth and income spectrum. By giving a clear delineation of the impact of tax policies on market values, q theory provides a measure of windfalls and the effects of changes on vertical equity.

Salinger and Summers begin by estimating q values for the 30 Dow companies for the years from 1959 through 1978. They then compute tax-adjusted q s, designated Q , which explicitly take account of shareholder taxes. Fully 22 of the 30 Dow industrial companies had 1978 q s of less than 1, indicating that they shouldn't invest at all. However, only eight had Q s of less than 1, reflecting the fact that dividend taxes reduce the opportunity cost of investing retained earnings. Salinger and Summers surmise that the reason the eight companies with Q s of less than 1 still invest involves the fact that capital is not really malleable and homogeneous. Regression tests support the tax-adjusted q theory but suggest that much of what affects investment decisions is not captured by the q variable.

Next, Salinger and Summers simulate the effects that three corporate tax reforms—full indexing for inflation, a 25 percent acceleration of depreciation allowances, and a reduction in the tax rate from 46 percent to 40 percent—would have on market values. They assume that the tax changes were unexpected

and permanent, and that anticipated inflation was a permanent 5.3 percent. Cash flows were discounted at a real rate of 10 percent.

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The simulations indicate that full indexing would raise the market values of most of the Dow companies by 5 to 10 percent, but the range of changes is quite dramatic. The stock market value of Sears drops 13.3 percent, while American Brands rises 20.4 percent in value. (The only other company that declines in value is AT&T, down 2.9 percent.) This finding contradicts earlier studies of indexing, which suggest that it would be neutral or would actually raise tax liabilities (and reduce market values). Salinger and Summers believe the reason for their contrary finding is that their tests focus on the long-run impact rather than the immediate effect on current income.

Accelerating depreciation by 25 percent raises market values by an average of 7 percent, with a range of

2.4 percent (Procter and Gamble) to 20.7 percent (Bethlehem Steel). As one would expect, the change has the greatest impact on capital-intensive companies. The corporate rate reduction boosts market values by an average of 13 percent, with a low of 2.6 percent (Bethlehem) and a high of 34.7 percent (Exxon). The huge impact on Exxon’s value reflects the interaction of foreign tax credits with the reduction in domestic rates.

Finally, Salinger and Summers estimate the effect that the new tax-adjusted Qs would have on investment outlays. All the reforms give rise to investment increases that generally are less than 5 percent, considerably less than the accompanying increases in market values. Salinger and Summers caution that the estimates of investment effects are subject to substantial error. Even so, they believe it is clear that tax changes have a larger impact on market values than on investment. In some cases, the differences are enormous. For instance, full indexing raises International Paper’s market value by 20.2 percent while its investment increases a mere 0.6 percent. Of all the changes, accelerated depreciation and indexing of depreciation alone have the largest impact on investment. Accelerated depreciation, for example, raises Goodyear’s market value by 12.3 percent and its investment by 20.5 percent; in contrast, tax-rate reduction boosts Goodyear’s value by 20.4 percent and its investment only 13.5 percent. AE

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